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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/858,350	05/15/2001	Won Ho Jhe	18079-300101	1776

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EXAMINER	
LUU, THANH X	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 06/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/858,350	JHE ET AL.	
	Examiner	Art Unit	
	Thanh X Luu	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission received on August 1, 2003 has been entered.

Claims 1-17 are currently pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl (U.S. Patent 4,851,671) in view of Watanabe et al. (U.S. Patent 3,872,411).

Regarding claims 1-3 and 8, Pohl discloses (see Figure 1 and claim 1) a high frequency dithering probe for a high speed scanning probe microscope, comprising: a high frequency quartz-crystal resonator (2) having a fundamental resonant frequency in the range of 1MHz – 100MHz (20 MHz; see column 2, lines 58-59) and a thickness of 0.01 mm – 2.0mm (0.1mm; see column 2, line 32); and having an electrode (5 or 6) attached to a surface of the quartz-crystal resonator; and a probe (1) attached to the

quartz-crystal resonator. Pohl further discloses (see claim 1; "said tip (1) is directly attached to one surface of an oscillating body (2)") the probe (1) is attached on the surface of the quartz-crystal resonator (2). Pohl also discloses (see column 1, lines 64-66 and column 2, lines 15-25) the scanning probe microscope is a noncontact mode ("maintained at said working distance from said surface" and "brought sufficiently close") atomic force microscope. Pohl further discloses (see column 2, lines 30-34) the length, height and width of the resonator (2) are all about 0.1mm. Thus, according to the scale of the figures, the probe is at most .2mm in length. Pohl does not specifically disclose the resonator having a disk type shape or having the claimed area. Watanabe et al. teach (see Figures) a quartz crystal resonator formed in a flat disk type. Watanabe et al. further teach (see column 4, lines 15-25) that high resonant frequencies are dependent upon the diameter and thickness of the disk. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a disk type resonator having the claimed area in the apparatus of Pohl in view of Watanabe et al. to provide a desired resonant frequency.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl in view of Watanabe et al. and further in view of Quate (U.S. Patent 5,354,985).

Regarding claim 4, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl in view of Watanabe do not specifically disclose the probe is a cantilever attached to the resonator. Quate teaches (see Figure 2) a resonator (35) in which a cantilever (10) probe is attached to. Thus, Quate recognizes that scanning probe microscopy could further be implemented with a cantilever probe. It would have been obvious to a

person of ordinary skill in the art at the time the invention was made to have a cantilever attached to the resonator of Pohl in view of Watanabe et al. and Quate to further detection by providing near field scanning.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl in view of Watanabe et al. and further in view of Quake (U.S. Patent 6,002,471).

Regarding claim 7, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl in view of Watanabe et al. do not specifically disclose the probe is a carbon nanotube. Quake teaches (see claim 11) an atomic force microscope having carbon nanotube probes. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a carbon nanotube probe in the apparatus of Pohl in view of Watanabe et al. and Quake to improve detection by providing a very sharp and durable tip for finer scanning.

6. Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl in view of Watanabe et al. and further in view of Karrai (U.S. Patent 5,641,896).

Regarding claim 5, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl in view of Watanabe et al. do not specifically disclose the probe as a sharpened optical fiber tip. Karrai teaches (see Figure 4) a sharpened optical fiber tip (10) attached to a quartz crystal resonator (5). Karrai further recognizes (see column 8, line 38-40) that such tips can be easily manufactured. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a sharpened optical fiber tip in the apparatus of Pohl in view of Watanabe et al. and Karrai to reduce manufacturing costs.

Regarding claim 9, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl in view of Watanabe et al. do not specifically disclose the probe is made of transparent material to transmit light. Karrai teaches (see Figure 3) a probe (not labeled) made of a transparent material (optical fiber) attached to a quartz crystal resonator (tuning fork) to transmit light. Thus, Karrai recognizes that another type of scanning can be performed with a transparent probe. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a probe made of transparent material in the apparatus of Pohl in view of Watanabe et al. and Karrai to further detection by providing optical scanning tunneling microscopy.

7. Claims 6, 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl in view of Watanabe et al. and further in view of Nishioka et al. (U.S. Patent 4,880,975).

Regarding claim 6, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl in view of Watanabe et al. do not specifically disclose the probe is a tungsten tip. Nishioka et al. teach (see Figure 1 and column 7, lines 15-16) a tungsten tip (5) on a scanning tunneling microscope. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a tungsten tip in the apparatus of Pohl in view of Watanabe et al. and Nishioka et al. to improve detection by providing a more resilient and durable tip.

Regarding claims 10 and 12, Pohl discloses (see Figure 1) the probe is attached on a side of the crystal resonator. Pohl also discloses (see column 1, lines 64-66 and column 2, lines 15-25) the scanning probe microscope is a noncontact mode

("maintained at said working distance from said surface" and "brought sufficiently close") atomic force microscope. Pohl and Watanabe et al. do not specifically disclose the probe attached in such a manner that the probe extends through a hole formed in the resonator. Nishioka et al. teaches (see Figure 1) a probe attached in such a manner that it extends through a hole (at 4a) formed in a resonator (2). Thus, Nishioka et al. recognize that a probe can be more securely attached through the resonator. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to attach the probe in such a manner that it extends through a hole of the resonator in the apparatus of Pohl in view of Watanabe et al. and Nishioka et al. to provide a more resilient and durable probe.

8. Claims 11, 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl in view of Watanabe et al. and Nishioka et al. as applied to claims 1 and 10, and further in view of Karrai.

Regarding claim 11, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl, Watanabe et al. and Nishioka et al. do not specifically disclose the probe as an optical fiber tip. Karrai teaches (see Figure 4) an optical fiber tip (10) attached to a quartz crystal resonator (5). Karrai further recognizes (see column 8, line 38-40) that such tips can be easily manufactured. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a sharpened optical fiber tip in the apparatus of Pohl in view of Watanabe et al., Nishioka et al. and Karrai to reduce manufacturing costs.

Regarding claim 14, Pohl discloses (see Figure 1) the probe (1) is a pointed tip. Pohl, Watanabe et al. and Nishioka et al. do not specifically disclose the probe is made of transparent material to transmit light. Karrai teaches (see Figure 3) a probe (not labeled) made of a transparent material (optical fiber) attached to a quartz crystal resonator (tuning fork) to transmit light. Thus, Karrai recognizes that an additional type of scanning can be performed with a transparent probe. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a probe made of transparent material in the apparatus of Pohl in view of Watanabe et al., Nishioka et al. and Karrai to improve detection by providing scanning tunneling-type microscopy.

Regarding claims 13 and 17, Pohl discloses (see column 1, line 8-10) the scanning probe microscope is used as an atomic force microscope. Pohl in view of Watanabe et al. and Nishioka et al. do not specifically disclose the microscope as a near field scanning optical microscope. Karrai teaches (see column 1, lines 10-17) that the scanning probe microscope could be put into different uses, such as, near field microscopy or atomic force microscopy. Thus, Karrai recognizes that scanning probe microscopes could be easily adapted to different types of scans. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a near field optical microscope in the apparatus of Pohl in view of Watanabe et al., Nishioka et al. and Karrai as to provide improved scanning through observations in the near field.

Regarding claim 15, Pohl discloses (see claim 1) the probe is directly attached to a surface of the resonator. Pohl in view of Watanabe et al. and Nishioka et al. do not specifically disclose removing a portion of the electrode to attach the probe. However, choosing the particular manner in which the probe is attached is a matter of design choice and would require only routine skill in the art. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to remove a portion of the electrode in the apparatus of Pohl in view of Watanabe et al., Nishioka et al. and Karrai to more easily attach the probe directly to the surface of the resonator.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pohl in view of Watanabe et al., Nishioka et al. and Karrai as applied to claims 1, 10 and 14, and further in view of Ohtaki et al. (U.S. Patent 5,276,324).

Regarding claim 16, Pohl discloses (see Figure 1) an electrode attached to a resonator. Pohl in view of Watanabe et al., Nishioka et al. and Karrai do not specifically disclose the electrode as being transparent. Ohtaki et al. teach (see column 3, lines 33-38) using transparent electrodes to reduce light loss in scanning tunneling microscopy. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an transparent electrode in the apparatus of Pohl in view of Watanabe et al., Nishioka et al., Karrai and Ohtaki et al. to reduce light loss in the scanning and improve detection.

Response to Arguments

10. Applicant's arguments filed August 1, 2003 have been fully considered but they are not persuasive.

Applicant asserts that the prior art does not disclose a "thin" or "flat" crystal resonator. However, the term "thin" is not found in the claims. Regardless, since the prior art meets the thickness specified in the claim, as understood, it is "thin" and "flat."

Applicant also asserts that it would not have been obvious to provide a disk-type crystal resonator in the apparatus of Pohl in view of Watanabe et al. Examiner disagrees. Simply changing the shape of a crystal resonator requires only routine skill in the art. In addition, Watanabe et al. teach that disk-type crystal resonators are conventional and advantageous, and thus, such a modification would have been obvious.

Therefore, as set forth above, this rejection is proper.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh X Luu whose telephone number is (571) 272-2441. The examiner can normally be reached on M-F (6:30-4:00) First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thanh X Luu
Primary Examiner
Art Unit 2878

06/04